TECHNIUM
SOCIAL SCIENCES JOURNAL

Vol. 27, 2022

A new decade for social changes

www.techniumscience.com

ISSN 2668-7798

9 772668 779000

Investigation the Place of BIAN Standard in Digital Banking Enterprise Architecture

Narjes Farzi

Sadad Informatics Corporation (Senior Business Analyst, New Product Development Group), Tehran, Iran

Farzi.narges@gmail.com

Abstract. Today organizations encounter many issues such as newfound technologies, new business models, and rapid variations. Nowadays, following evolutions in the global context, caused by information and communication technology in the field of trade, industry, and specifically information technology, has impelled organizations, companies, and particularly banks to undergo changes and alter their reaction method to the market. In this way, the role of enterprise architecture and using standards and reference models are crucial to the organizations. Accordingly, the organization that wants to be active in the digital transformation and move towards digital banking should be able to implement an agile enterprise architecture and use reference models such as BIAN. The objective of this article is to investigate the role of BIAN standard in moving towards digital banking.

Keywords. Enterprise Architecture, Reference Models, Banking, Business Architecture Industry Network (BIAN), Digital Transformation, Agility

1- Introduction

Financial industries has undergone great changes in the past years that are caused by new regulations, increasing competition by the arrival of new players to the market and, the change in customers' demand; as a result, any organization, in order to survive in the dynamic and changing environment, needs high flexibility to respond more rapidly to these changes and satisfy existing demands. Accordingly, financial industries and particularly banks, are thinking of how to create a cross-ecosystem based on the needs of the customer's life cycle and their own production cycle to be able to provide financial and non-financial products and services in accordance with customer's demands. Moving toward creating such an ecosystem with traditional methods is impossible and in order to achieve this goal, being capable of applying knowledge and multiple skills in organizational architecture definition, creating a service-oriented Enterprise architecture and, using reference models in order to standardize financial systems and ecosystems for making interaction and cooperation between financial industry and banks is very important to them. Nowadays, one of the most famous standards is the BIAN standard. This standard has made an effective move toward digital banking and creating an open financial platform with using service-oriented concepts in service domain definition and providing standard APIs in integrating internal

interactions (Application to application (A2A)) and external interactions (Business to Business (B2B), Business to Customer (B2C)).

2- Review of Literature

2.1 Definition of Enterprise and Enterprise Architecture

Architecture is a set of technical plans that each considers and models one of the aspects of the system. Architecture descriptions should be applicable and contain an execution plan, including necessary resources, scheduling, costs, and executive architecture establishing.

Accordingly, enterprise architecture is a set of technical plans, graphs, and documents used for defining missions, required technologies to perform mentioned missions, required transitional processes to launch new technologies and respond to changes. Generally, Enterprise architecture provides frameworks, devices, perspectives, and views to comprehend the existing situation (As-Is) and express the state of goal (To-Be). Also, enterprise architecture makes it possible to determine the transition path from the current position to the goal situation. [8]

Figure 1. Migration from As-Is Architecture to To-Be Architecture with Enterprise Architecture [8]

•Benefits and results of Enterprise Architecture

Some benefits of the enterprise Architecture include interoperability, increasing agility with decreasing complexity obstacles, creating an integrated system and comparable in system description, work processes improvements, integrating the business process of enterprise, intra-enterprise data integration, making the connection between data and third parties, and eliminating redundancy. [8]

2.2 Digital Transformation

Various definitions of the digital transformation are presented in different resources that some of them would be mentioned in this part. Based on the definition of the MIT Centre for Digital Business and Cap Gemini Consulting, digital transformation is the use of technology to achieve performance improvements and efficiency of enterprise [10]. In another definition, the digital transformation includes the digitizing process with a concentration on digital productivity and innovation and existing physical product reinforcement with digital capabilities. Digital evolution is a profound evolution that accelerates the activities, processes, qualifications, and business models to fully operate the changes and opportunities caused by digital technologies and their influence on society in strategic and priority methods. [11,2]

As a result, digital transformation is the re-alignment of technology, business models and processes, or new investment to achieve value in the organization and customers. Amongst digital transformation benefits for organizations, there are increasing profit margin, increasing efficiency, interoperability, customer service improvements, customer retention and loyalty, creating new ecosystems by integrating financial institutions, success in reducing costs, and increasing the income of new products and services. It is required to move from traditional organizational architecture with a concentration on information technology with a holistic approach and a device for achieving innovation and adaptation in the organization to benefit from digital transformation in enterprise architecture. [1, 2]

•Digital Transformation Challenges

On the way to digital transformation, there are many challenges such as lack of understanding the necessity of digital transformation emergence in organizations, resistance to change, coordination and leadership, especially about roles, responsibilities and unknown or paradoxical goals, lack of a clear vision of organizational goals, inefficiency in information technology to respond to changes, the existence of complicated and dependent networks, heritage systems and increasing complexity in organizations in the age of digital transformation. [7]

2.3 Definition of Agility

Agility is the ability of organizations to fast and efficiently responding to changes in market demand with the goal of finding customer requirements according to price, characteristics, quality, quantity, and transformation. This ability affects the organization to produce and deliver a new product at an efficient cost. In general, agility is defined as a behaviour and capability that makes organizations flexible to changes. Agility is investigated in three different areas: system agility, process agility, and business agility. [3]

•Agile Enterprise Architecture

Agile enterprise architecture is result-oriented and concentrates on the creativity and innovation of individuals. Agile architects interact with all the people of the organization and are a connection between developers and executers and agile teams.

Agile frameworks in organizational architecture provide an ordination and category of architectural issues that guarantee the comprehensiveness and interactivity of architectural products on one hand, and convergence of information technology and business on the other hand. Agile architecture frameworks make adaptation and customization of the organization possible.[3,7]

Deployment and implementation of agile enterprise architecture in an organization may always encounter many challenges such as creating components with loose coupling, reusability, encapsulation of services and components, creating interoperability, moving towards service orientation, creating simplicity and transparency, time to market, inertia of organizations in reaching agility in order to fast and on-time respond to proposed changes. [3,7]

2.4 Digital Banking

Digital transformation has recently been making fundamental changes in technology, society, and business models, and from a "Digital Darwinism" point of view, a company's vastness and background cannot guarantee its survival, and just those who can adapt to new circumstances can survive.

With the development of digital technology, customers live in a world full of digital connections, and their experience of other industries affects their expectations from financial service providers. This has led to the development of customer and bank connection and emphasizes adopting a customer-oriented approach by banks to respond to increasing expectations. [1,2]

Since the technology and changes are transforming rapidly, customer needs are changing too, and in this competitive environment, the banks should be able to move with these changes and respond to customers' requests in the most minimum time. For instance, it is not expected that the modern customers who provide most of their needs, such as online shopping, education, etc. with a smartphone, go to the bank for banking matters and spend their time commuting to the bank branch. In this regard, if banks are not able to adapt to the customers' requirements, they will lose many of their customers. Accordingly, banks' future will move towards digital banking. Therefore, today, customer experience is important and has made a lot of ongoing changes in this area. [1, 2]

Hence, organizations should apply enterprise architecture instruments and methods, agile enterprise architecture implementation, and reference models like BIAN in order to overcome existing challenges and move towards digital banking. [1, 2]

3- BIAN Standard

BIAN Standard by introducing a toolbox that includes tools such as service domain landscape, business scenarios, business capability maps, data model, open APIs, and defining principles applied in designing this tool, which is mentioned in its manuals, intends to present an open-source architecture framework in the financial industry and especially banking. [4]

Figure 2. BIAN Tool box [4]

The following brief definition of these tools is presented to provide more information. (All this tools are available in www.bian.org and www.Portal.bian.org websites)

The most important part of the BIAN standard is its service landscape. Based on BIAN definition, each service domain is a capability building block that operates and executes operations on asset type and is defined discretely and individually that plays a business role. As it is illustrated in the image below, each service domain has two main parts. Core functions and logic, and core data part that perform the main operation and the business role, and service operations part that is responsible for making connections in a life cycle with other service domains. These exchanges take place by offer service and consumer service. [5]

Figure 3. Service Domain Mechanics [5]

The most important components of any service domain include asset type and functional pattern that is applied on asset type, control record which its life cycle is managed in each operation, and consists of different behaviour qualifiers in each operation, and service operations that are used to make a connection between other service domains. [4, 5]

Figure 4. BIAN Meta model [4, 5]

Service domains form a comprehensive whole that covers all of the tangible and intangible assets in the bank. These service domains are categorized and presented in the form of services landscape. The value chain of every enterprise can be drawn using these service domains.

In addition to the definition of service domains, BIAN standard presents various instances of business scenarios to a better comprehension of how the service domain operates and the process of operations that are exchanged in a scenario for its audience so that any organization is able to implement its processes by these service domains.

Based on APIs definition in BIAN standard, APIs of banks are categorized into two classes: internal APIs and external APIs. Internal APIs consist of service domain exchanges via service operations that this definition supports A2A integration. External APIs are the APIs that are defined in its BIAN and sandbox. These APIs are defined either with mapping by ISO20022 standard or with micro services or new concepts that BIAN working groups have made and defined.

Also, for designing BIAN information architecture, the BOM model is used. In this model, any service domain is considered as an entity, and BOM is defined corresponding to it. This model is formed around 11 objects. Defining the objects of this model is done with collaboration with standards such as ISO, IFX, FIX and etc. [4, 5]

4- Applying BIAN Standard Moving Towards Digital Banking

In the past decades, banks had their own special business and ecosystems and operated just in that ecosystem and provided special and limited services. After establishing digital transformation and moving towards it, the banks do not have their own ecosystems, and the value

chain of the bank is not defined internally, but there is a cross-industry value chain that is defined among different industries and can be raised as a platform that provides various services. In this case, the banks' value chain is connected to other industries' value chains so that they can present a different experience due to customers' needs. In the digital transformation context, banks, instead of playing intermediation roles, become creating value centres for customers and support start-ups and knowledge-based businesses. As a result, banks are actually involved in transactions and banking activities and updating their services with new technologies to provide products and services to providers in order to give added value to consumers. In the meantime, in order to move towards digital banking, banks should move towards standardizing. One of the standards in this area is BIAN that its role in digital banking is addressed below.

4.1 BIAN Standard and its Role in Enterprise Architecture

BIAN view is based on service-oriented architecture and best practices. This standard in main levels presents some layers of artifact enterprise architecture that cause an integrated landscape of the organization. The artifacts that are given in any layer of enterprise architecture to be able to design a service-oriented enterprise includes:

- In the business layer, business capacity, service landscape, business scenario, service domains, wireframe
- In the information layer, the business object model (BOM), asset decomposition model, control records
- In the application layer, artifacts like application capacity, message format, logical system, and open APIs

Based on the claim of BIAN standard, it is trying to present a standard for all of the financial industries and banks, and since organizations have their own requirements and limitations in using technology and choose their required technologies regarding these limitations, this standard does not enter to technology layer and has not presented any artifacts.

4.2 BIAN Standard and its Role in Digital Transformation

Considering Omni-channel banking, open banking, modular banking, and smart banking as four pillars of digital banking, open banking and modular banking that are two main pillars of these four bases in digital banking can be covered using BIAN standard concepts and move towards digital banking. In the following, these two bases would be investigated in detail.

•Applying BIAN Standard in Open Banking

One of the most important applications of BIAN standard is cooperation with different providers in the open banking debate. BIAN standard is the first standard that discussed the vendor-agnostic concept, and regarding this, by defining open APIs provided a headstock to cooperate with various providers and fin techs.

In this context, an example of applying the BIAN standard in open banking reference architecture that is presented by IBM Company can be mentioned.

Regarding open banking reference architecture presented by IBM Company, this architecture consists of different parts, that their layers and applying BIAN standard in them are investigated in the following parts. [7, 9]

Figure 5. IBM's Open banking reference architecture [7, 9]

The first layer that is shown in the lower part of the image includes core applications and systems of record layer, which consists of deposit, customer, etc. and covers the original activities of the bank. The next layer includes business services. Then, there is an internal API gateway layer to make connections and exchange between business services. The next layer includes open banking APIs and services that are supposed to access and communicate with the final customer or third party. Connection channels are defined in the last layer. On the left side of this model, common capabilities such as security and UX design can be observed. On the right side of the model outside of bank capabilities like business partners, banking directories, etc. are defined to communicate with banks or other financial institutes. [7, 9]

One of the presented concepts to categorize and define APIs in BIAN standard is the value chain concept. The value chain in this standard is created using the BIAN services landscape and its business domains, business area, and service domains definition.

Figure 6. The BIAN Service landscape-First API inventory [4, 5]

As it is illustrated in the image, there are four main areas in the value chain including products, customers, and operations channels. The connection point with customers and third parties and also other financial industries is channels. This communicational portal uses different APIs to make a connection. For instance, A2A APIs are applied to communicate between services and application, or to make a connection with final customers or third parties B2B/B2C/B2B2C APIs are used.

Figure 7. Value chain and BIAN's APIs [4, 5]

Now with this classification, the API layers defined in open banking reference architecture can be addressed by BIAN standard APIs. According to this, the internal API gateway layer in this architecture can be defined by A2A APIs (internal APIs) in BIAN standard which are the messages that are exchanged between domain services via service operations, and the connection point of any domain service to these APIs is addressed to connect and exchange between business services.

Open banking APIs and services in open banking reference architecture that is considered to access and communicate with the final customer or third party can be addressed through APIs that are defined in the BIAN portal. It is worth noting that these APIs include behavior qualifiers that are defined in the control record and are connection points of any service domain to BIAN information architecture or BOM. [4, 5]

Accordingly, using these APIs that have a fracture and micro-service capability, network traffic can be controlled in the required times or cooperate with different vendors and provide service to the customer in the best way, without getting them involved. On the other hand, using this standard, the innovation range is not limited to the ecosystem inside the bank, and with cooperation with different providers and fin techs, a new experience for the customer and the value for the banks can be made.

Besides, in the business service layer, BIAN service domains such as customer reference data, customer position, etc. are used to define and integrate them.

•Applying BIAN Standard in Modular Banking

Among other applications of this standard, the modular banking area can be mentioned. Modular means that all the components of the organization can be designed in a discrete and modular way. BIAN standard has attempted to recognize and model all of the required components of the financial and banking context by defining discrete service domains and presenting service landscape. According to this, we can move towards modular banking via decomposing of business contexts in the banking context and using concepts like service orientation and micro-services that make legacy systems less complicated. On the other hand, providing the desired product using these service domains and their connections in providing complex banking products makes it possible to achieve A2A integration in organizations.

4.3 Applying BIAN Standard in Point Solutions

If the banks can comprehend and analyse their customers' behaviour, they are able to improve the customer travel experience by providing personalized products and services. In this regard, one of the tools of BIAN standard to apply in point solutions is using wireframes to determine all of the required service domains and connections between them in a practical range.

Point solutions include Steps and patterns used to apply BIAN designs. BIAN business architecture determines general levels that should be used in point solutions. This approach includes a description of some frameworks and model views that are used in BIAN implementation projects.

This concept can be used to recognize customers, required connections with the final customer, and achieve a comprehensive insight from its behaviour. This insight is vital for better recognizing customer needs and efficient relationship with him.

Figure 8. Showing Customer aspects by BIAN Wire Frame [4, 5]

Conclusion

One of the most significant principles of the organizations and companies is customer satisfaction and loyalty, the wide distribution of products, preserving the connection with customers, providing services, product development, shopping facilitation, and consequently, customer experience optimization. As a result, any organization, in order to survive the dynamic and changing environment of today, needs high flexibility to respond fast to these changes and satisfy the current needs. In this regard, customer travel is a dynamic journey today that banks and financial industries are just a small part of its chain. As we mentioned in this article, these challenges cannot be overcome without using reference models such as the BIAN standard.

Considering the mentioned challenges in this article, creating an enterprise architecture based on service orientation in the early stages of digital transformation leads to decreasing complexities and increasing success possibility. Also, we can ensure that digital transformation attempts to achieve the desired architecture.

On the other hand, banks and financial industries can cooperate with each other and satisfy customer needs by applying concepts of service domains and defined APIs in BIAN standard in open banking and modular banking context. These capabilities lead to banks' organizational architecture improvements, presenting innovative products, customer travel experience improvement, and facilitating movements towards digital banking.

References

- [1] Digital agility in financial firms (Emmanuel Yoo), February 2019.
- [2] M. Hafsi, S. Assar, What Enterprise Architecture can bring for digital transformation? , IEEE 18th Conference on Business Informatics, 2016.
- [3] The Agile way of working has arrived in banking, Deloitte, September 2019.
- [4] BIAN How-to-Guide Design Principle & Techniques V7.0, BIAN Association, 2018.

- [5] G. Rackham, H. Tesselaar, K. D. Groot, A framework for the financial services industry, BIAN Edition 2019.
- [6] G. Rackham, BIAN Semantic API Practitioner's Guide, BIAN Association, 2020.
- [7] H. Tesselaar, P. Derde, B. Hao, BIAN Webinar, July 2020.
- [8] Government Enterprise Architecture, Government Enterprise Architecture of New Zealand (Government Business Capability Model, Version 2.1), 2018.
- [9] Open Banking Reference Architecture, IBM Corporation, 2020.
- [10] G. Westerman, C. Calmjane, D. Bonnet, P. Ferraris, and A. McAfee, "Digital Transformation: A Roadmap for Billion-Dollar Organizations," MIT Center for Digital Business and Capgemini Consulting, 2011.
- [11] M. Hafsi, S. Assar, Managing Strategy in Digital Transformation Context: An Exploratory Analysis of Enterprise Architecture Management Support, IEEE 21st Conference on Business Informatics (CBI), 2019.